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AGAINST HUNGER by M. N. Beeler, from the July 1943 issue of Capper's Farmer, Topeka, Kansas.

THRU RESEARCH AND DISTRIBUTION OF KNOWLEDGE TO FARMERS, AMERICAN LAND-GRANT COLLEGES HAVE MADE POSSIBLE THE FOOD ABUNDANCE THAT IS NOURISHING OUR ARMED FORCES, CIVILIANS AND MANY HUNGRY PEOPLE ABROAD DURING THIS WORLD-WIDE EMERGENCY

WE ARE NOT HUNGRY. THERE IS NO FAMINE IN THE LAND. Starvation is not one of our problems. Plagues born of malnutrition are unknown here. Our people are physically strong. They are well nourished by comparison with peoples elsewhere. In no other country is there such variety and abundance of food. Even tho we have resorted to mild rationing, great stores of life-giving sustenance still are available.

And food always has been so plentiful that our people could be finicky if they chose--finicky at the expense of their own bodies. We could indulge in "unwise food habits," grumble about what was set before us, prefer this and dislike that.

For this plenty we are indebted to scientific research in agriculture. To this research the country owes its very existence. To extension of research discoveries into practical application on farms, the country owes its freedom from hunger. To both of these and the agencies responsible for them--the Agricultural Experiment Stations and the Agricultural Extension Services--the nation owes its future security. For these are the discoverers and distributors of knowledge which make more and more food, production possible to feed more and more millions who man the wheels of progress.

Without the knowledge revealed by scientific research, without its translation into farm practices, 6 million farmers could not feed themselves and the remaining 127 millions of their fellow countrymen, plus many millions more in foreign lands. Without that knowledge millions upon millions of men and women would not be free to man our industries and our vast war production. Our population still would be largely rural as it was before the Civil War.

Fantastic, this notion about the nation's dependence upon research? Let him who is skeptical review the progress in food-production practices during the 56 years since the act providing for agricultural experiment stations was passed, and since agricultural extension came into existence 29 years ago. Let him consider a few of the scientific discoveries as they affect food supply.

1-Research has proved that balanced rations save feed. Without the knowledge which experimenting has revealed, no farmer could remain solvent and maintain a major hog, beef, dairy, sheep or poultry project. Further, assuming that prices to cover the waste could be maintained, present demands for animal foods would require perhaps twice as much feed grains as we produce.

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2-Research has found ways of controlling animal diseases. There would be no adequate livestock industry in this country if we had not learned how to control hog cholera, Texas fever in cattle, Bang's disease, bovine tuberculosis; internal and external parasites of hogs, sheep, chickens and turkeys; blackleg, anthrax, foot-and-mouth disease in cattle; nutritional diseases in all classes of animals.

3-Research has found ways of controlling the most serious insect and disease enemies of the principal food and feed crops. It takes no vivid imagination to appreciate what would happen to the potato crop, for instance, if we had not learned how to protect it from Colorado potato beetle, psyllids, blight and half a dozen other pests. There would be no commercial fruit crop in absence of control for codling moth, curculio, tree borers, San Jose scale, blight, canker, aphids, weevils, anthracnose, and scores of other insects and diseases. Cabbage yellows, tomato wilt, bean beetles have threatened the supply of these vegetables. Damage by boll weevil, Hessian fly, flax wilt, rusts and smuts in grain, chinch bugs, army worms, grasshoppers, corn borer, alfalfa wilt, even if not under specific control is definitely lessened by proved measures. Any one, unchecked, seriously threatens the supply of food, feed, and fiber.

4-Research has established new principles of animal breeding for making rapid improvement in productivity. Artificial insemination is one of the newest; the Babcock test for fat content of milk one of the oldest. For nearly 50 years this last discovery has provided the basis on which the nation's greatest single agricultural production has been bought and sold. It also has been the basis for feeding, breeding and weeding dairy cattle. Without it and the knowledge applied in feeding during the last 20 years, the nation would go hungry this year for milk, butter, cheese and the other products of dairying, despite the great cow population.

Research also has revealed the knowledge which makes a marketable lamb in half the time required under grandfather methods, a 1,000-pound steer in 12 months, a 200-pound hog in 180 days, a broiler in 8 weeks, a laying pullet in less than 5 months. Fowl paralysis has been literally bred from flocks. How to produce hens capable of laying as profitably (considering pullet development costs) in their second as they did in their first year is definitely known.

5-Research has bred better and more productive strains and varieties of plants, including fruits, vegetables and field crops. Hybrid corn, tho not a variety, is the offspring of scientific experimenting. It has made 100-bushel yields commonplace in good corn country. It has consistently outproduced open pollinated--10 bushels or more an acre, and 10 bushels is enough to make 100 pounds of pork, for instance, even under wasteful feeding. Or it is half enough to make a 1,000-pound steer under a pasture system of beef production.

Yields of major crops, wheat, corn, oats, barley, cotton, potatoes, hay have not declined despite older and older land. Every section of every state has its best and proved varieties of grains and forages. Without the increase by which they excel older varieties and strains, we would not be able to feed the greater numbers of livestock in this emergency.

6-Research has solved many of the engineering problems of agriculture. It has investigated the adequacy of farm construction, designed buildings, tested materials; planned farmstead and field layouts for greatest efficiency, studied housing and storage facilities. It has worked out mechanical methods of preventing wind and water erosion, better methods of land drainage. It has invented machines and methods for doing work, saving human labor and time and it has co-operated with manufacturers in testing and improving all types of mechanical equipment.

7-Research has learned ways to control noxious weeds which are capable of destroying the usefulness of land. It has established methods of restoring fertility, re-establishing vegetation, improving pastures. In fact there is no major or minor farm enterprise that has not been facilitated at least, no major production problem which it has not solved or alleviated.

And agricultural extension has carried all this knowledge and more (for the list could be multiplied indefinitely) to the farms and has directed its correlation into practice. So let him who still is skeptical review these additional facts:

1-Practical improvement of the farm poultry enterprise was one of the first extension projects and extension has worked hard at that job. Egg production per hen in 1914 when agricultural extension was created, was 85 eggs a year. It hasn't been below that average since. Further it hasn't been below 90, except in the drouth year of 1934, when it was 89, since 1925, nor below 100 since 1937. In 1941 production a hen was up to 110 eggs a bird, which is a gratifying average when several hundred million hens are involved. The period of greatest increase in average egg production marks the period since extension has become most widely and most effectively organized.

2-A parallel to the egg-production record has been the baby-chick saving campaign. In most flocks losses averaged 45 to 50 per cent of the birds put into brooders. Extension drew upon the knowledge of research and showed how those losses could be reduced to 10 or 5 per cent or less.

3-Extension put together the results of research to eliminate serious losses of turkeys. This nation just about lost the industry to blackhead and other diseases. The U. S. D. A. yearbook for 1924 reported turkeys decreased from 11,000,000 in 1890 to 6,500,000 in 1900 and to 3,700,000 in 1910. The number in 1924 was estimated to be at approximately that last figure. But by 1929 they were up to 18,136,000 and by 1939 the crop totaled 33,201,000. It was 33,775,000 and 33,189,000 in 1940 and 1941. Restoration of turkey production and its expansion to record volume is an extension accomplishment of record and cannot be denied.

4-Extension also has worked hard on improvement of dairy cows and dairy production. altho information on production a cow is meager, some figuring indicates it probably wasn't much more than 3,700 pounds of milk a cow in 1910. U.S.D.A. bureau of dairying writers estimated it at 4,000 pounds milk and 160 pounds fat in 1920. By 1924 it was up to 4,167 pounds milk and 167 pounds fat and by 1941 to 4,742 pounds milk and 187.5 pounds fat. Progress in milk production per cow has been steadily upward except for the drouth and depression years.

Comparable jobs to poultry and dairy improvement have been done in swine, beef and hog production altho the results are not so easily measured statistically. But swine sanitation deserves special mention. Extension has been largely responsible for establishing that practice.

5-Extension likewise has worked hard on crop improvement. Three examples will illustrate results. Soybean expansion is clearly and definitely an extension project. The average yield in 1924 was 11 bushels an acre. Only once in 1936 (drouth year) has the yield been below 15 bushels, since 1934 and twice it was above 20. In 1941 the yield was 18.2; in 1942, 19.5 bushels an acre. This increase in yield is all the more remarkable in the face of an increase from $1\frac{1}{2}$ million acres to more than 10 million.

Not since 1921 has the average yield of potatoes been below 100 bushels an acre. And for 1940, 1941 and 1942 it averaged 132, 131 and 137, respectively. From 1899 to 1921 the yield exceeded 100 bushels an acre only 7 times.

Extension, thru county agents who directed yield tests, proved hybrid corn. Statistics indicate only that the corn yield is not seriously declining. But it may be significant that the 28.1-bushel average of 1899 has been exceeded or equaled 16 times in the 43 years. And five of those times were the last 6 years since hybrids have been grown widely. The sixth year missed the 1899 average by only 0.3 bushel. Before 1937 there had been a stretch of 14 years when the 28-bushel yield had not been equaled. The longest stretch previous to that had been 5 years.

6-Another early extension project was home food preservation. Methods devised and procedures taught made possible the home canning of non-acid vegetables such as corn, peas, beans, asparagus and greens prior to and during the first World War. The methods and procedures which home canners will use this year will be those which were established by extension.

7-Perhaps the greatest accomplishment of extension has been in the broad field of production engineering---fitting together the piecemeal discoveries of research into a pattern not only for specific enterprises but for the entire farm productive program. It has had its part in solving specific engineering problems, mechanical, civil, architectural, electrical and even chemical. But it has done the bigger job also, and so well that certain researchers are beginning to methodize their findings. Hence we have methods of pork, beef, lamb, dairy and poultry production; methods of growing corn, wheat, sorghums and potatoes; methods for improving pastures, managing land, establishing young people in farming; methods in controlling diseases and pests.

As in the case of research, the list of extension projects could be multiplied many fold, and they add up to an unmistakable service to farmers in making their efforts more fruitful, and to the nation in providing it with food.

Finally let him who still may be skeptical go back to 1860, the census year nearest the date (July 2, 1862) when Abraham Lincoln signed the Land-Grant College Act, forerunner of our present system of state agricultural

experiment stations and extension services. At that time about 38 per cent of our total population (31,443,321) was rural.

1-Since the date the proportion of farm population to urban population has declined. But for the first 30 years the decline was slow. In 1890 the census year nearest the date (March 2, 1887) when Grover Cleveland signed the Hatch Act which established the agricultural experiment stations, rural population was 37.7 per cent of the whole. By 1910, the census year nearest Woodrow Wilson's approval of the Smith-Lever Act (May 8, 1914) which created the agricultural extension services, the percentage had dropped to 34.8. By 1920, 6 years after extension was established, it had declined further to 29.9 per cent; by 1930 to 24.7; by 1940 to 23; by 1942 to 21.4; and an estimate indicates that in 1943 only about 20 per cent of the total United States population lives on farms.

2-The proportion of farms to total population has declined steadily since 1890. In that year there was one farm to every 13.7 persons in the United States. In 1910 the ratio was 1 to 14.4; in 1920, 1 to 16.4; in 1930, 1 to 19.5; in 1940, 1 to 21.5; and in 1942 about 1 to 22.

3-The average size of farm families has declined from about 6 persons in 1860 to 4.7 persons in 1940.

4-Number of farms has decreased from the maximum of 6,448,343 in 1920 to 6,096,799 in 1940.

5-Average size of farms declined from the early part of the 19th century until 1890 when it was 137 acres. Since then it has increased to 174 acres in 1940.

6-Total land in farms increased from 407,735,041 acres in 1860 to 1,060,852,000 in 1940.

7-Today the number of farm residents is the lowest in the 33-year period since statistics on farm and non-farm population have been collected. As of January 1, 1943, the Bureau of Agricultural Economics estimates the number to be 27,821,000. That is down from 32,077,000 as reported by the census of 1910, which was the first to make the distinction between rural and urban population. Altho total population increased by nearly 42 millions during that period, farm population declined 4 1/2 millions.

These statistics show that fewer and fewer farmers are tilling more and more land and feeding more and more people. The greatest changes in this respect have come the last 29 years since agricultural extension was established. It should be significant that the number of persons whom each farm fed increased by 5.1 from 1920 to 1940, during increasing extension activities, whereas the increase from 1890 to 1910 before extension was organized was only 0.7 person per farm.

Yet, despite declining farm population, despite progressively fewer farms, despite greater acreage worked per man, despite increasing total population, farmers have continued to feed the nation lavishly. In 1942 they turned out an all-time record in food production. Their accomplishments the last quarter century are all the more remarkable when it is remembered that most of the land involved has aged farther and farther from its virgin fertility as the years passed.

How have fewer and fewer farmers been able to feed more and more people? Only by the application of better methods. And those methods have evolved from experiments conducted by the experiment stations and from knowledge carried to farms by the extension services.

For these agencies there is no substitute. They have sustained the energy and effort of farmers in the past and unhindered they will do so in the future. But they must remain free of purposeful domination that is removed from the states which they serve. They must remain free to pursue the sound methods of research and teaching that have meant great progress since they came into being. They must remain free, in the future as in the past, to attack farm problems forced by vagrant nature and fomented by human friction. To assume that their work is done is folly. To charge that their methods are outmoded is false. They constitute the vital ordnance for that battle against hunger which is perpetual.